

Division of Solid Waste Management Training Infomercial

March, 2018

DSWM Training Infomercial



Why the Infomercial ??

- Enhance DSWM Outreach in General
- Promote Training in General
- Promote New Training Especially



DSWM Training Infomercial - Why?

Why Training?

- DSWM Governmental Duty
- Because it's a matter of getting it right
 - Consistency Statewide



- Because not knowing our business is not an option
- Its also about managing risks and limiting liability



We <u>all</u> need to be smart



DSWM Training Infomercial - Goals

Training Goals



- Training-specific
 certifications (e.g. landfill operator, asbestos, lead...)
- Educate Regulated Community
- Educate Ourselves
- Quality and Consistency
- Risk Management



DSWM Training Infomercial

Infomercial Topics

- DSWM Training Opportunities in general
- New Training
 - Statewide Uniform Inspection Training (SUIT)
 - Hazardous Waste Inspector Training (HWIT)
 - Sampling and Analysis Training (SAT)
 - Environmental Media (EMSAT)
 - Soils and Soil Testing (SSATT)





DSWM Training Infomercial – Home Page



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Solid Waste Management

The mission of the Division of Solid Waste Management (DSWM) is to protect, improve, and promote health and environmental quality through the responsive, effective oversight of waste management activities and the beneficial use of recovered materials.

Solid waste may be defined as any useless, unused, unwanted, or discarded materials. Hazardous waste, problem waste, toxic substances, and recyclables may be distinguished from other solid waste. DSWM has established focused programs to address each of these.

You may contact DSWM at Solid.Waste@tn.gov or 615-532-0780. If you need to reach a particular staff member, please see our contact list and be sure to consult our organization chart.



The Solid Waste Program regulates material recovery facilities, transfer stations, and landfills for non-hazardous solid waste.







The Hazardous Waste Management Program regulates hazardous waste generation, transportation, storage, treatment, and disposal.







The Materials Management Program deploys strategies of waste reduction, recycling, composting, and the diversion of materials, including problem waste.







The Toxic Substances Program works to protect people from environmental and health hazards caused by Asbestos, Lead-Based Paint, and PCBs.







DSWM Training Infomercial – Training Page

Program Areas ▼ Permitting ▼ About ▼ Public Participation Contact ▼

DSWM Training Opportunities



A certified Landfill Operator must be present at a municipal solid waste landfill during all hours of operation.

(Read More



The State Uniform Inspection Training Program is designed to provide Class I Landfill Operators with a basic knowledge of Tennessee's facility inspection program.

(Read More



Hazardous waste generators are required to file annual hazardous waste reports. Free workshops are held annually to assist generators in preparing these reports.

(>) Read More



DSWM is exploring expanding our Hazardous Waste Inspector Training program to the public - let us know what you think.

(Read More



Anyone engaged in lead-based paint (LBP) activities in "target housing" and "child-occupied facilities" must be

(Read More



Anyone who performs asbestos activities in schools or public and commercial buildings must be accredited by

Read More



Authors of the county Annual Progress Reports can



Grant workshops are an opportunity for applicants to



The Environmental Show of the South conference and



Landfill Operators Certification Training (LOCT)

How to run a landfill

- 30 Hours Field and Classroom
 - Regulations
 - Landfill Math, Surveying
 - Landfill Plans and Daily Operations
 - Waste Acceptance and Inspections
 - Gas, Groundwater, Leachate
 - Closure and Compliance
- Valid for 3 years
 - Recertification with Training







Asbestos Accreditations - Website Training

- Accreditations Requirements
- Firm and LEA Applications
- Individual and LEA Applications
- Accreditation Fee Schedules
- Accredited Asbestos Professionals
- Asbestos Program DSWM Rules

Accreditations for Asbestos Professionals

The <u>Asbestos Accreditation Requirements</u> are applicable to all persons and firms who perform asbestos activities in schools or public and commercial buildings, as well as training providers who offer asbestos training courses to individuals who have or seek accreditation in Tennessee.

These Rules stipulate that only accredited persons shall perform asbestos activities inclusive of developing management plans in schools, project designs, conducting response actions, inspections, and collecting clearance air samples to confirm the completion of a response action involving friable and non-friable asbestos-containing materials and asbestos-containing building materials in schools or public and commercial buildings.

Asbestos Accreditation Applications

***IMPORTANT NOTICE: Application processing changes for individuals who perform asbestos activities in schools or public and commercial building in Tennessee effective July 3, 2017

- Firm and LEA Application to Conduct Asbestos Activities (CN-1299)
- Individual and LEA Employees (require 2 forms):
 - "EVEA" form Eligibility Verification for Entitlements Attestation form (CN-1497)
 (An "EVEA" form with valid ID(s) must accompany all individual and LEA employee applications)
 - o Application to Conduct Asbestos Activities for Individuals and LEA Employees (CN-1300)



Lead Certification - Website Training

How to Become a Certified:

- Firm
- Individual Inspector
- Project Designer
- Risk Assessor
- Supervisor
- Training Provider
- Worker

- Rules
- Study Guides

Lead Certification

Commissioner's Certification Examination

Effective September 26, 2000, individuals engaged in lead-based paint (LBP) activities in "target housing" and "childoccupied facilities" in the State of Tennessee must be certified by the Commissioner of the Tennessee Department of
Environment and Conservation. The Lead-based Paint Abatement Program is located in the Division of Solid Waste
Management. Individuals seeking certification, except for those currently certified by EPA, must pass the Commissioner's
(third-party) examination for LBP inspector, risk assessor or supervisor, which is separate from examinations associated
directly with a training course. Certification examinations must be taken and passed within six (6) months following the
completion of a lead-based paint training course accredited by the EPA, or the State of Tennessee, or an EPA authorized
state.

The Commissioner's examination will be administered on the <u>following dates, times and locations</u> for individuals seeking LBP professional certification as an inspector, risk assessor or supervisor. Adjustments to dates, time, and/or location must be initiated through the program office. Please contact Katona Greer at 615-532-0846 for more information.

Third Party Lead Examination Schedule

All examinations begin at **10:00 a.m.** in Nashville*. In Knoxville and Memphis, exams begin at **10:30 a.m.** unless otherwise specified by the examiner. Exams held in Memphis and Knoxville are scheduled upon request.

2018	Nashville*	Memphis	Knoxville
January	11 & 18	-	-
February	22	8	-
March	8	-	29
April	12	5	-
May	10	-	25
luno	7	22	



DSWM Workshops – EFOs Live and Online

Hazardous Waste Annual Reporting

- Calculating Quantities
- Preventing Common mistakes
- Avoiding Violations

Annual Progress Report Workshops

- Online Assistance
- Interactive Guidance

Grant Workshops

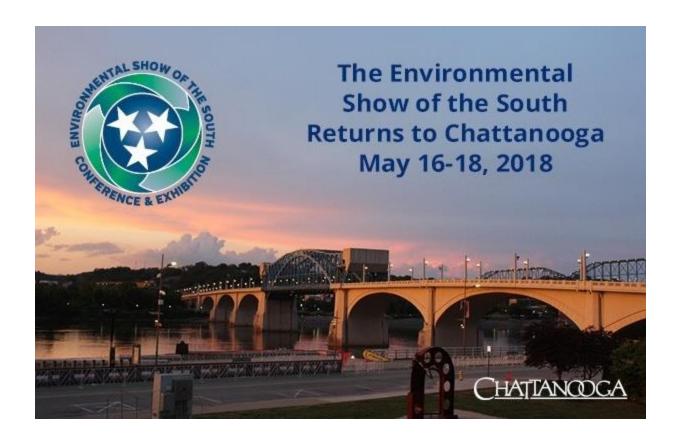
- Offerings and Requirements
- Grant Manual and Instructions Review
- Process and Timeline







Environmental Show of the South - ESOS





Environmental Show of the South – ESOS

"Great Networking"...

"Excellent Technical Presentations"

Professional and Continuing Education

Professional Engineers can earn 13.5 hours of professional development. Engineers should keep their own records, including a marked copy of the agenda, paid receipt, and badge.

Attorneys can earn Continuing Legal Education (CLE) credits through the Tennessee Bar Association. Select the CLE option during registration.

to 9 hours of continuing education at no additional charge. Be sure to sign in at your session.

SWANA Members can earn Continuing Education Units (CEUs) for relevant topics. Pick up a CEU form at the TN SWANA booth.

Certified Hazardous Materials Managers/Practitioners can earn up to 5 Certification Maintenance Points (CMPs) per day. CHHMs and CHMPs should keep their badges and agendas.

Professional Geologists in TN do not need continuing education, but those licensed in other states may earn credit.



New DSWM Training

- Statewide Uniform Inspection Training SUIT
 - Geared toward consistency in Solid Waste facility inspection
- Hazardous Waste Inspector Training HWIT
 - Geared toward consistency in Hazardous Waste facility inspection
- Sampling and Analysis Training SAT
 - EMSAT Environmental Media 101
 - SSATT Soils/Subsurface Investigation and Testing 101



Statewide Uniform Inspection Training - SUIT

- Developed by Team of DSWM Inspectors
- Input from Regulated Community
- Led and implemented by Jerry Branham - DSWM Environmental Consultant
- Goal Consistency in Compliance Interpretation



Uniformity



Statewide Uniform Inspection Training - SUIT

- Separate Training Modules for
 - Class I, II, III/IV Landfills
 - Transfer and Processing Facilities
 - Convenient Centers
- Training for DSWM Staff
 - Ensures consistency between DSWM staff and Field Offices
- Training for Regulated Community
 - Ensures consistency between DSWM and O/Os

a Violation...is a Violation... is a Violation





SUIT Content

- Statement of Purpose
 - "Green Box" Policy
- Policy and Rule Review
 - OAC Observation of Concern
 - V1 Minor Violation
 - V2 Major Violation
- Pre-Inspection Checklist
 - Facility-Specific Inspectors Guide Permit & Rule Driven
- Line Item Inspection / Compliance Instruction
- a Violation...is a Violation... is a Violation





SUIT Content

Line Item Inspection / Compliance Instruction



Three components

- Citation Reference (eg. 0400-11-01.04(2)(a)4
 General Facility and Performance Standard
- "Green Box" Policy Information Rules of Thumb
- Clarification and Discussion Photos



Lets look at some SUIT Sample Content

Line Item Inspection / Compliance Instruction



- Inadequate Vector Control 8010
- Inadequate Artificial or Natural Barrier 8030
- Unsatisfactory Access Roads and Parking 8050
- Inadequate Erosion Control 8180



8010: INADEQUATE VECTOR CONTROL SLIDE 1 OF 2

Citation Reference: 0400-11-01-.04(2)(a)1

General Facility Standards – Overall Performance Standard - The facility must be located, designed, constructed, operated, maintained, closed, and cared for after closure in such a manner as to minimize to the extent practicable the propagation, harborage, or attraction of birds and flies, rodents, or other disease vectors.





8010: INADEQUATE VECTOR CONTROL SLIDE 2 OF 2

Control of disease vectors is one of the main goals of the proper operation of a landfill. A relatively small number of flies or a rat that came in with a load should not normally be considered a violation. Neither should a few birds that occasionally show up at the working face (or seagulls during seagull "season"). Potential concerns for vector control can be included in the comments. However, when the actual number of vectors is large, the evidence (rat burrows, maggots) is significant, or an indication that breeding or increasing in numbers is observable, this violation should be cited.

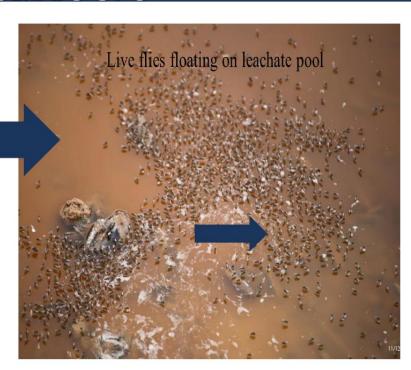




8010: INADEQUATE VECTOR CONTROL SLIDE 3 OF 3

Flies and maggots.
This is a life cycle.
Propagation
VIOLATION

In this case there is an additional VIOLATION. The vector is in a pool of leachate.







8030: INADEQUATE ARTIFICIAL OR NATURAL BARRIER SLIDE 1 OF 2

Citation Reference: 0400-11-01-.04(2)(b)1

General Facility Standards – Control of Access and Use - The facility must have an artificial or natural barrier which completely surrounds the active portion of the facility and must have a means to control entry, at all times, through the gate or other entrances to the active portion of the facility.



8030: INADEQUATE ARTIFICIAL OR NATURAL BARRIER SLIDE 2 OF 2

The required barrier is intended to prohibit vehicular traffic (or easy foot traffic) from entering the active portion of the landfill when the site is not in operation. "Natural barriers" are usually described on plans or addressed in permit. "Artificial barriers" includes gates, cables, fencing, or other artificial means of controlling access (and are also usually described on plans or addressed in permit). A violation can be noted if there exists evidence of access (e.g., ATV or 4x4 tracks, etc.) to controlled portions of the landfill; there should be clear indications of non-controlled access. If a breach in barrier by more natural means (e.g., tree fallen on fence, etc.) is observed, a written comment or AOC can be made and a chance given to avoid a V1 violation. If nothing is corrected upon follow-up or next inspection, a V1 violation should be cited.



8030: INADEQUATE ARTIFICIAL OR NATURAL BARRIER SLIDE 3 OF 5

Barriers

Thick natural barrier. This is not easily passed through

Fencing.
Artificial barrier.







8030: INADEQUATE ARTIFICIAL OR NATURAL BARRIER SLIDE 4 OF 5

Barrier

Thick natural barrier.
VIOLATION

NO







8030: INADEQUATE ARTIFICIAL OR NATURAL BARRIER SLIDE 5 OF 5

Barriers

Natural barrier

Artificial barrier







8050: UNSATISFACTORY ACCESS ROAD(S)/PARKING AREA(S)
SLIDE 1 OF 2

Citation Reference: 0400-11-01-.04(2)(b)3

General Facility Standards – Control of Access and Use - If the facility is open to the public, or if it is otherwise necessary for proper operation, roads within the facility, easements, and parking areas shall be designed, constructed, and maintained so as to be accessible in all weather conditions. Traffic control signs shall be provided as necessary to promote an orderly traffic pattern to and from the solid waste discharge area to maintain efficient operating conditions.



8050: UNSATISFACTORY ACCESS ROAD(S)/PARKING AREA(S) SLIDE 2 OF 2

If operating portions of the landfill are not accessible and/or are potentially dangerous to access due to poor road conditions, a V1 violation should be cited. A non-corrected V1 violation can trigger a significant V2 violation upon follow-up. This regulatory language states that roads must be maintained so as to be accessible in all weather conditions. Weather can potentially affect normal operations and impede regular operation, however, roads should be maintained in order to not drastically slow or stop operations.





8050: UNSATISFACTORY ACCESS ROAD(S)/PARKING AREA(S) SLIDE 3 OF 5

This is not a public access road.

This is an access road for other landfill operations. There is heavy rutting. VIOLATION?

NO for 8050

AOC- if this became worse it could impede facility operations.





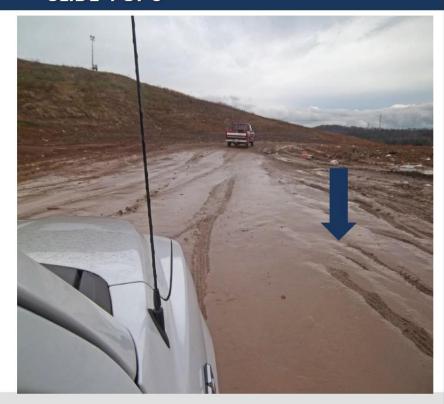


8050: UNSATISFACTORY ACCESS ROAD(S)/PARKING AREA(S) SLIDE 4 OF 5

Excessive muddy conditions at or near the working face.

. If it appears to be causing safety issues (vehicles being difficult to control or the public slipping while unloading) it should be cited as V1.

If not an AOC would be warranted.



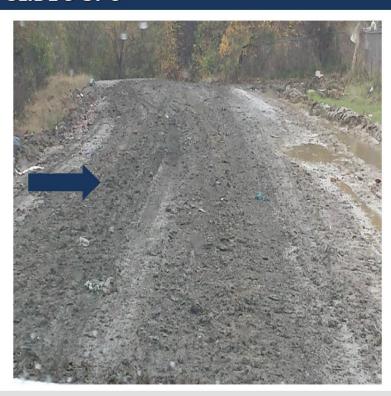


8050: UNSATISFACTORY ACCESS ROAD(S)/PARKING AREA(S) SLIDE 5 OF 5

There is a paved public road under this. This is from the landfill.

VIOLATION?

YES







8180: INADEQUATE EROSION CONTROL

SLIDE 1 OF 3

Citation Reference: 0400-11-01-.04(2)(i)6

Run-on, Run-off, and Erosion Control - The operator must take other erosion control measures (e.g., temporary mulching or seeding, silt barriers) as necessary to control erosion of the site.

Citation Reference : 0400-11-01-.04(8)(c)4(ii)

Closure and Post-Closure Standards - Closure Requirements - The final surface of the disposal facility or disposal facility parcel shall be graded and/or provided with drainage facilities in a manner that minimizes erosion of cover material (e.g., no steep slopes).



8180: INADEQUATE EROSION CONTROL SLIDE 2 OF 3

Citation Reference : 0400-11-01-.04(8)(c)5

Closure and Post-Closure Standards - Closure

Requirements - In order to minimize soil erosion, as soon as practicable after final grading, the operator shall take steps as necessary to establish a protective vegetative cover of acceptable grasses over disturbed areas of the site. These steps shall include seeding, mulching, and any necessary fertilization at a minimum, and may include additional activities such as sodding of steeper slopes and drainage ways if such are necessary.



8180: INADEQUATE EROSION CONTROL SLIDE 3 OF 3

The facility must take permit-specified action for minimizing erosion. Erosion on side slopes should be evaluated. Minor erosion rills occurring on recently completed slopes where grass has yet to be established may not be a violation as long as Best Management Practices (BMPs) are being utilized to minimize and correct the erosion. When BMPs are not being consistently implemented and there are obvious signs of erosion (such as hard channelizing or uncovering of waste) are present, **a V1 violation should be issued.** If a discharge causing an objectionable contrast to receiving waters or visible loss of sediment from a site is observed, the Division of Water Resources (DWR) should also be notified (as described in MOA guidance, PN084). More clarification on erosion and sediment control practices will be found in a future developed Policy for Controlling Erosion at Operational Areas of a Landfill.





8180: INADEQUATE EROSION CONTROL

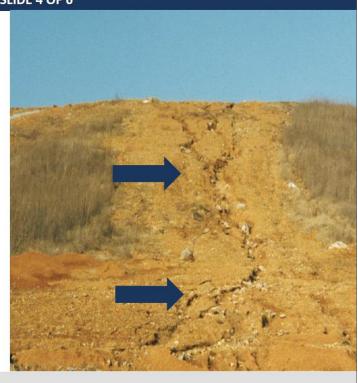
SLIDE 4 OF 6

Deep ruts.

Hard channeling

VIOLATION

YES





63



8180: INADEQUATE EROSION CONTROL SLIDE 5 OF 6

Is that exposed waste? Washout of Waste?

VIOLATION?

YES

Deep rills.

VIOLATION?

YES

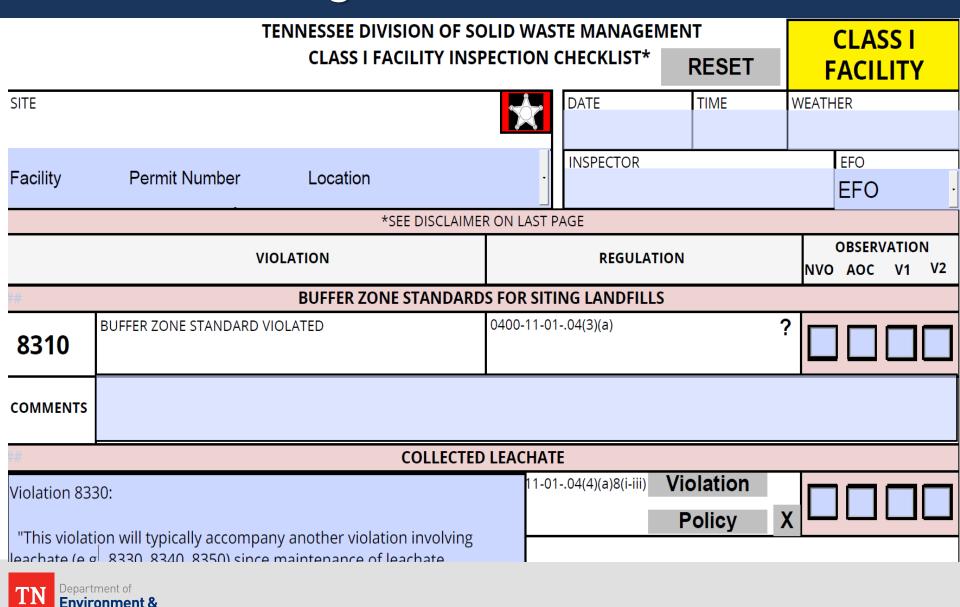






	TENNESSEE DIVISION OF SOLID WASTE MANAGEMENT CLASS I FACILITY INSPECTION CHECKLIST* RESET				CLASS I FACILITY			
SITE			文	DATE	TIME	WEATHE		<u> </u>
Facility	Permit Number	Location		INSPECTOR			FO FO	
		*SEE DISCLA	MER ON LAST P	AGE				
VIOLATION				REGULATION		O NVO	BSERVATION NO V1	
##		BUFFER ZONE STANDA	RDS FOR SITI	NG LANDFILLS				
8310	BUFFER ZONE STANDARD \	/IOLATED	0400-11-01	04(3)(a)	?			
COMMENTS								
COLLECTED LEACHATE								
8330	LEACHATE IMPROPERLY MA	ANAGED	0400-11-01	04(4)(a)8(i-iii)	•			





Conservation

S.U.I.T. Training Schedule TBI Building - Nashville 901 R. S. Gass Boulevard Nashville, TN 37216

February 13, 2018	8:00am - 9:30am	Transfer Station
	9:30am - 11:00am	Convenience Center
	12:00pm - 1:30pm	Transfer Station
	1:30pm - 3:00pm	Convenience Center
February 14, 2018	8:00am - 9:30am	Transfer Station
	9:30am - 11:00am	Convenience Center
	12:00pm - 1:30pm	Transfer Station
	1:30pm - 3:00pm	Convenience Center
February 15, 2018	8:30am - 4:00pm	Class III Landfill
February 16, 2018	8:30am - 4:00pm	Class III Landfill

February 23, 2018	8:30am - 4:00pm	Class I Landfill
August 28, 2018	8:30 am - 4:30 pm	Class I Landfills
August 29, 2018	8:30 am - 4:30 pm	Class I Landfills

S.U.I.T. Training Schedule Knoxville Environmental Field Office 3711 Middlebrook Pike Knoxville, TN 37921

January 30, 2018	8:00am - 9:30am	Transfer Station
	9:30am - 11:00am	Convenience Center
	12:00pm - 1:30pm	Transfer Station
	1:30pm - 3:00pm	Convenience Center
	3:00pm - 4:30pm	Tire Storage Facility
January 31, 2018	8:00am - 9:30am	Transfer Station
	9:30am - 11:00am	Convenience Center
	12:00pm - 1:30pm	Transfer Station
	1:30pm - 3:00pm	Convenience Center
February 1, 2018	8:30am - 4:00pm	Class III Landfill
February 2, 2018	8:30am - 4:00pm	Class III Landfill
August 21, 2018	8:30 am - 4:30 pm	Class LL andfills

August 21, 2018	8:30 am - 4:30 pm	Class I Landfills
August 22, 2018	8:30 am - 4:30 pm	Class I Landfills



Division of Solid Waste Management S.U.I.T. Training Schedule 2018





Hazardous Waste Inspector Training – HWIT

Do you find RCRA Confusing?

- How do the regulations apply to me?
- Is my container of hazardous waste properly closed?
- How do I manage my satellite accumulation areas?
- How do I properly manage my pharmaceutical waste?
- What is a hazardous secondary material?
- What if my generator status changes?
- What about solvent wipes?





Hazardous Waste Inspector Training - HWIT

- Developed by DSWM HW Inspectors
- Led and implemented by Janet Dutto - DSWM Environmental Consultant
- Goals Internal
 - Inspection Consistency
 - Reporting Consistency
 - Rule Change Appraisals
 - Frequently Cited Issues



- Like SUIT, Regulated Community Will Benefit
 - Input Sought on Interest and Content



Hazardous Waste Inspector Training – HWIT

- Internal Training Modules for
 - Inspection and Reporting
 - Regulatory Updates
 - Commonly Cited Violations
- EPA Proposes RCRA
 Rules Easing Standards
 for Pharmaceutical
 Wastes

- Training for DSWM Staff
 - Ensures current regulatory basis
 - Ensures consistency between DSWM staff and Field Offices
- Training for Regulated Community
 - Ensures current regulatory basis
 - Ensures consistency between DSWM and O/Os



Lets look at some HWIT Sample Content



- Regulatory Update January 2018
- Common Hazardous Waste Generator Violations





Regulatory Update

Janet Dutto, TDEC - DSWM

January 25, 2018



DSW (Definition of Solid Waste) Amendments

On January 4, 2018 >>>>> In Effect in Tennessee (Except for Vacated Sections)

July 7, 2017 U.S. Court of Appeals vacated:

Application of 4th Recycling Legitimacy Factor Verified Recycler Exclusion

TN Rules currently include those sections. Regulatory hold date of **July 2, 2018** per Emergency Rule Filing





What is the New DSW Rule?*

Purpose

Amends the definition of solid waste to <u>promote recycling</u> and <u>protect human</u> health and the environment.

Promote - HOW?

Adding additional exclusions to the definition of a solid waste to promote recycling.

Protect - HOW?

Legitimacy criteria/documentation, containment standards, emergency preparedness, recordkeeping, notifications, etc.

* See Rule for all regulatory requirements





Major Elements - DSW Rule*

Major elements include:

- New Terms and Definitions
- Adds 3 new reclamation exclusions
- Modifications to existing variances & Non-waste determinations
- A procedure for verifying reclamation and intermediate facilities
- Definition of the legitimacy criteria for recycling (4 factors)
- Notification requirements
- Prohibition of sham recycling
- Expanded Documentation Regarding Speculative Accumulation





^{*} See Rule for all regulatory requirements

New Definitions*

New Definitions

- Analogous raw material
- Contained
- Intermediate facility
- Land-based unit
- Remanufacturing
- Hazardous secondary material (HSM)
- Hazardous secondary material acceptance plan
- Hazardous secondary material generator
- Intermediate

Speculative Accumulation labeling/recording dates provision added which will apply to anyone subject to speculative accumulation

* See Rule for all regulatory requirements







New Reclamation Exclusions*

New exclusions include:

- HSM Reclamation under the Control of the Generator Rule 0400-12-01-.02(1)(d)1(xxiii)
- HSM Transfers to Verified Reclamation or Intermediate Facilities Rule 0400-12-01-.02(1)(d)1(xxiv)
- HSM Transferred for Remanufacturing Rule 0400-12-01-.02(1)(d)1(xxvii)

* See Rule for all regulatory requirements







Common Hazardous Waste Generator Violations

Hazardous Waste Inspector Training

Janet Dutto - March 2018



Failure to Determine



Failure to Make a Hazardous Waste Determination

- Is the material a solid waste?
- Is the material a hazardous waste?





Hazardous Waste Determination Violation

How to Avoid This Violation

- 1. Make a determination on ALL waste generated on-site
- 2. Treat unknown material as a HW during the determination process (label, close, date, etc.)
- 3. Keep necessary documentation for both hazardous and non-hazardous waste



Failure to Perform Weekly Inspections

Both Small Quantity Generators and Large Quantity Generators are required to perform a *weekly* (*within days*) *inspection* of the hazardous waste container storage areas.

These inspections must also be documented.



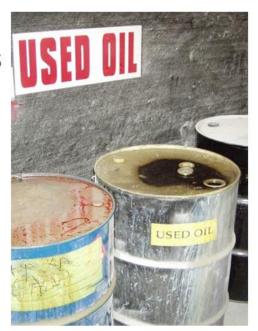




Failure to Properly Label

Used Oil Containers and Tanks

Any Container or Tank holding used oil must be labeled as "Used Oil"







Failure to Close Containers

Containers holding hazardous waste must be **closed** except when adding or removing waste



Definition of "Closed"?





Hazardous Waste Inspector Training

Interested in Training?





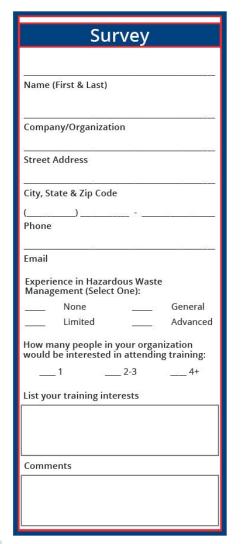




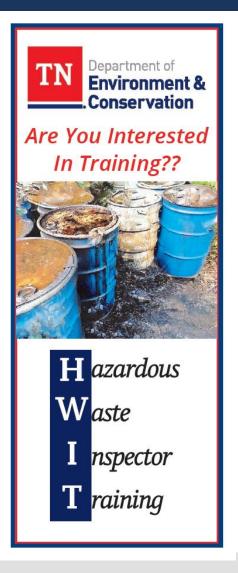












Survey Feedback.....Interest??

Please complete the survey in the distributed brochure or go to our online survey at:



http://www.tn.gov/environment/hwit

Your feedback is very important to assess program interest! Also, your contact information will be used to notify you of any upcoming external training!!





Contact Information

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Division of Solid Waste Management
Chattanooga Field Office
1301 Riverfront Parkway, Suite 206
Chattanooga, TN 37402
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Janet.dutto@tn.gov





Sampling and Analysis Training (SAT)

- Environmental Media (EMSAT)
 - » Environmental Media Sampling 101
- Soils and Soil Testing (SSATT)
 - » Soils / Subsurface Investigation and Geotechnical Testing 101







Environmental Media Sampling and Analysis Training

Introduction and Welcome

Patrick Mulligan, P.G., September 2017



EMSAT Modules

- Quality Assurance / Quality Control
- Sampling Planning
- Reading and Interpreting Laboratory Analytical Reports
- Common Statistical Methods for Groundwater Analytical Data
- Special Topics
 - Spotting "Lousy Data"
 - TCLP
 - Filtering Water Samples for Inorganics Analysis
 - What to expect of a DSWM Groundwater Monitoring Report Review





Environmental Media Sampling and Analysis Training

Quality Assurance / Quality Control







Quality Assurance / Quality Control

What to Expect of this module

- Resources
- Institutional QA/QC who thinks about this stuff?
- Quality Assurance vs. Quality Control
- Elements of Quality Assurance
- Elements of Quality Control
- Data Verification vs Data Validation
- Quality Control in Sampling Planning
 - Quality Control Level
 - Examples
 - Quality Assurance Plans
 - Quality Control Plans



CERTIFIED ORGANIC





Quality Assurance / Quality Control

Quality Assurance vs. Quality Control



Quality Assurance – Institutionalized processes

that help to ensure an organization functions to support quality outcomes

Quality Control – Project-specific activities

that help to make sure that what is generated is acceptable



QC is a subset of QA





Quality Assurance / Quality Control

Quality Assurance vs. **Quality Control**

Project-specific activities and devices that help to make sure that the data generated is useful for its intended purpose

Environmental Sampling - Quality Control Activities & Devices

Decontamination Trip Blank

Equipment Rinsate Duplicate Field Notes Labelling

Sampling Log Photographic Log Field Changes Chain-of-Custody

Equipment Testing Equipment Calibration

Investigation Derive d Waste Surveillance / Corrective Action

Laboratory – Quality Control Devices

Matrix Spike

Equipment Calibration

Matrix Spike Duplicates









Environmental Media Sampling and Analysis Training

Sampling Planning





Name, Position Date



Sampling Planning

What to Expect of this module

- Why bother with the sampling?
- Key concepts
 - Representativeness
 - Accuracy
 - Precision
- Resources
- Data Quality Objectives
- Details of Sampling Planning
 - · Sampling design
 - Scope determination
 - · Sampling and Analysis Plan Contents
- Example Case





Sampling Planning - Key concepts

The Trouble with Representative

- Homogeneous vs Heterogeneous
 - Nature of consistency of the media is it all the same throughout?
- Consider these:
 - · Glass of water
 - · Iced tea with excess sweetener
 - Layer cake
 - Packer truck of garbage
 - Bag of popcorn
 - Nicely tilled garden
 - Glacial moraine vs river rock





Sampling Planning - Key concepts







Sampling Planning - Key concepts

Other Key Concepts in Sampling and Analysis

- Accuracy
 - How Close Do I Get to the Bullseye
- Precision
 - How Often Do I Get the Same Result
- Want both Depends on both Sampling and Analysis











Sampling Planning

Data Quality Objectives Process

Guidance on Systematic Planning Using the Data Quality Objectives Process (USEPA, February 2006)

Seven Step Process

- Step 1 State the Problem
- Step 2 State the Goal of the study
- Step 3 Identify information inputs
- Step 4 Define the boundaries of the study
- Step 5 Develop analytic approach
- Step 6 Specify performance or acceptance criteria
- Step 7 Develop the plan for obtaining the data





Sampling Planning - Sampling Design Examples

Probabilistic Sample Design Example - K-1417 Drum Yard

Consider - Random, Stratified Random, Staged Sets







Sampling Planning - Sampling Design Examples

Probabilistic Sample Design Example - Grid

DSWM Hydrogeologic Investigation - Boring Spacing - 200' triangular grid

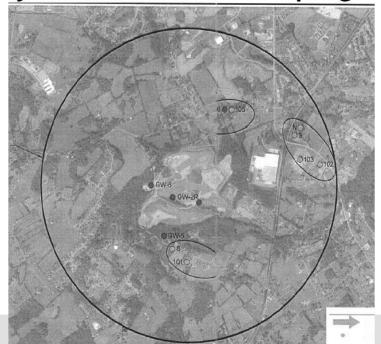






Sampling Planning - Sampling Design Examples

Judgmental Sample Design Example
Blount County - Residential Well Sampling







Sampling Planning - The Plan

Sampling and Analysis Plan (SAP)

- Useful SAP is the result of an effective DQO process
- Level of rigor thud factor (?)
 - DQO determines
- For use in the field what should it look like?
 - Includes all information you are going to need
 - Organization and personnel
 - Sample locations, rationale, analyses
 - Order of work
 - Containers and preservatives
 - Sample prep, well purging and sounding
 - Decontamination
 - Record keeping, forms
 - QC
 - Health and safety



Sampling Planning - Equipment & Procedures

Sampling Equipment

(EPA Science and Ecosystem Support Division Training, 2014)

Groundwater

- Peristaltic pump
- Bailer
- Submersible











Sampling Planning - Equipment & Procedures

Sampling Equipment

(EPA Science and Ecosystem Support Division Training, 2014)

Surface water, soil, sediment

- Coliwasa
- Dippers
- Direct flow











Reading and Interpreting Laboratory Analytical Reports

TDEC Training Program - March 2017







What to Expect From This Module

- The Chain-of-Custody
 - Sample Information
 - Analytical Methods and How to Order Them
 - Sample Custody
- The Lab Report:
 - Reporting "Levels"
 - The Case Narrative
 - Units
 - Non-Detects, Detections, and Limits
 - Dilutions
 - QA/QC Data from the Lab
 - Data Flags



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Lab Report Validation "Summary Sheet"

- Intended to provide a reference for the relatively "detailed" stuff:
 - COC Checklist
 - Common Units
 - Detection / Reporting Limits
 - Sig. Fig.'s
 - Lab QC samples
 - Data flags
- Let's look at the sheet









Common Statistical Methods for Groundwater Analytical Data

TDEC Training Program - March 2017







Basic Stats – A Review Using Plain Language

- We deal with a <u>sample</u> (a few measurements) from a <u>population</u> (the "full set")
- The number of measurements in the <u>sample</u> = n
- The arithmetic mean of the sample:
 - "Average" in typical language
 - If one number was used to represent a height of kids in a classroom, one might use the arithmetic mean
- The median of the sample
 - The height that lies right in the middle of lined-up kids (from shortest to tallest)
 Median

50% below 50% above



Population

Sample



Stats Summary Sheet

Provides basic steps supported by the Unified Guidance

Provides one or two methods recommended for specific

evaluations

Let's take a look...







SAT Update - Special Topics "Lousy Data"

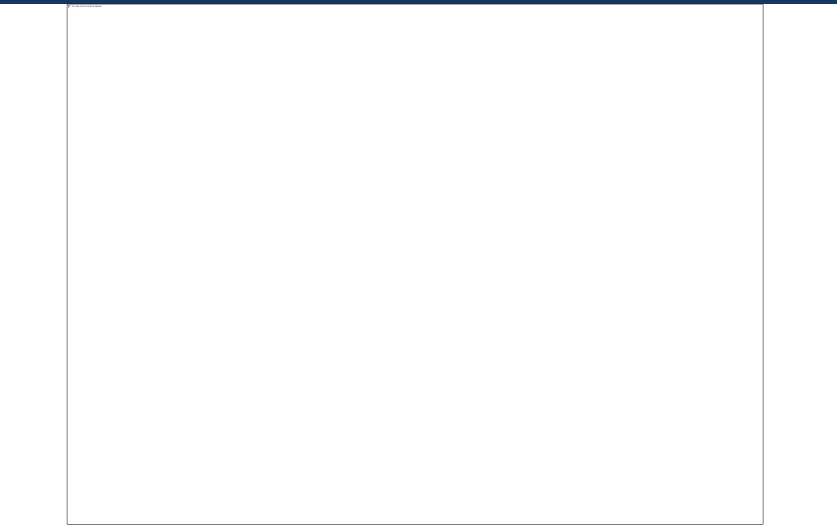
How is it that data gets to be lousy?

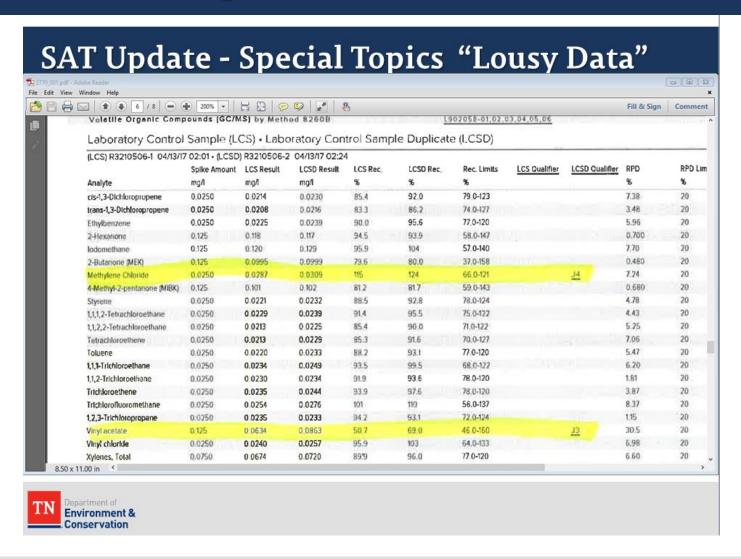
- Bad from the start poor planning, not representative
- Contaminated decon, order of work, laboratory issues
- Improperly obtained, contained, labelled
- Improperly preserved
- Improperly packaged and shipped
- Improperly manifested and documented
- Data quality unknown
- Poor lab practice













SAT Update - Special Topics "Lousy Data"

Spotting Lousy Data

- Ask questions
 - Does this make sense?
 - Historical context
 - Geographical context
- Look closely
 - Results
 - Detection limits
 - Lab QA/QC
 - Case narrative
- Stand back
 - Revisit DQOs



Do small problems make data unusable?







Soil Sampling and Testing Training (SSATT)

Patrick J. Mulligan, P.G., Patrick J. Flood, P.E., 2018



SSATT Modules

- Introduction and History
- Soil sampling methods and Applications PJM, P.G.
 - Drilling and Sampling Methods
 - Field logging and log usage
- Soil testing methods and Applications PJF, P.E.
 - Unified Soil Classification System
 - Tests for engineering properties of soil types
- American Society for Testing Materials (ASTM) methods will be our basis



Introduction - Soil Sampling and Testing Training

Goals of The Program

Primary Goal

- Common Baseline Understanding for the purpose of Review and Decision Making on:
 - Landfill Siting
 - Hydrogeologic Investigations
 - Landfill Design
 - Liner, cap, cover source materials
 - Settlement

Secondary Goal

 Have available references and resources to quickly answer soil sampling and geotechnical data-related questions







Introduction - Soil Sampling and Testing Training



Materials Sciences and Testing

- History of humankind is the history of materials science
 - Agriculture
 - Stone
 - Bronze
 - Iron









0



Introduction - Soil Sampling and Testing Training

Soils and Earthen Materials – Geotechnical Engineering

Geotechnical engineering - concerned with the engineering behavior of earth materials....

- Dates back to ancient Egypt and Mesopotamia
 - Roads, dams, canals, and earthen foundations
 - Observational
- Research more formal in 18th Century
 - Coulomb, Mohr, Darcy
 - 2D stress, failure planes, fluid flow
- 20th Century breakthroughs
 - Terzaghi, Taylor, others
 - consolidation, bearing capacity, plasticity, critical state theory





Introduction - Soil Sampling and Testing Training

....and speaking of Landfills

What do we use soil and rock data for?

- Siting geologic buffer, karst, other soil and rock features
- Hydrogeology GW flow, aquifer characteristic
- Borrow materials
- Liner / drainage material
- Cap and cover material
- Understanding stability





Introduction - Soil Sampling

What to Expect of The Sampling Portion

- Soil Sampling Basics
 - Engineering vs Agricultural applications?
 - Terminology
 - Limitations
- Soil Sampling / Geotechnical Resources
- Soil Sampling Investigations Planning
- Drilling methods / applications
 - · Auger / Casing drilling
 - Hydraulic push piston
 - Others
- Sampling types
 - Split spoons
 - Tubes
 - · Rock cores
- Field Logging and Classification





SSATT - Soil Sampling

Soil Sampling Basics

- What it is (for us)
 - Subsurface exploration for engineering properties













SSATT - Soil Sampling

Soil Sampling Basics

- "Bulk" vs "Intact" samples
 - Bulk samples from less discreet location lacking in-place moisture, texture, and grain orientation
 - Intact samples from discreet location retains in-place moisture, texture, and grain orientation







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SSATT - Soil Sampling

Soil Sampling Basics

- "Bulk" vs "Intact" samples
 - Bulk samples from less discreet location lacking in-place moisture, texture, and grain orientation
 - Intact samples from discreet location retains in-place moisture, texture, and grain orientation







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SSATT - Soil Sampling

Soil Sampling Basics "Cohesive" vs "Non-cohesive"

Cohesive – high clay and silt content

- plastic and compactable when moist
- hard and compact when dry



Non-cohesive – high sand and gravel content

- loose and runny when dry
- dense due to frictional and surface tension forces when moist

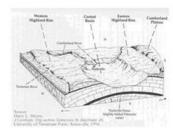




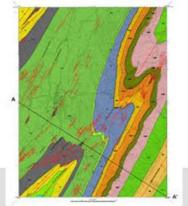
SSATT - Soil Sampling

Subsurface Investigation Work Plan

- Statement of purpose
 - Landfill siting
 - Borrow source
 - Hydrogeologic Assessment
 - Foundation design, etc.



- Scope of activities (Guidance, engineering principals...)
 - Numbers of borings / test pits / probes
 - Locations and depths
 - Soil sampling types and interval/locations
 - Samples for lab
 - Disturbed vs undisturbed
 - Field tests geophysical, groundwater, etc
 - Documentation, QA/QC





SSATT - Soil Sampling - Methods

Drilling and Sampling Methods - Auger Drilling

- ASTM D1452 Standard Practice for Soil Exploration and Sampling by Auger Methods
 - Solid Stem augers open hole sampling in cohesive soil
- ASTM D6151 Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling
 - Hollow-Stem augers loose, wet or sloughing materials



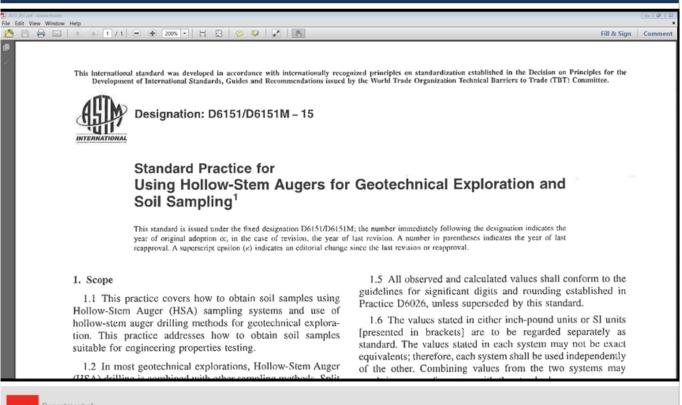




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SSATT - Soil Sampling - Methods





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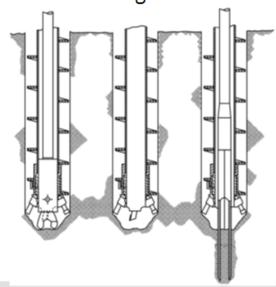


SSATT - Soil Sampling - Methods

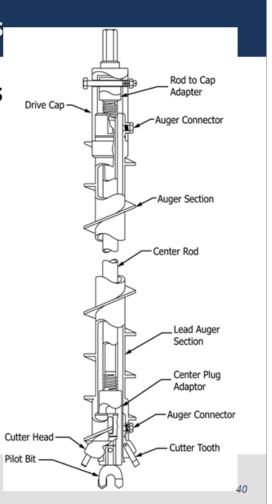
Drilling and Sampling Methods

ASTM D6151 -

Practice for Using Hollow-Stem Augers...









SSATT - Soil Sampling - Methods

Drilling and Sampling Methods - Rock Coring

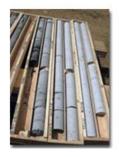
D2113 - Practice for Rock Core Drilling and Sampling of Rock for Site

Exploration











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SSATT - Soil Sampling - Soil Classification (Field)

Soil Classification

D2488 - Standard Practice of Description and Identification of Soils (Visual-Manual Procedure)

D2488 - Field procedure

D2487 - Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

D2487 - Laboratory verification

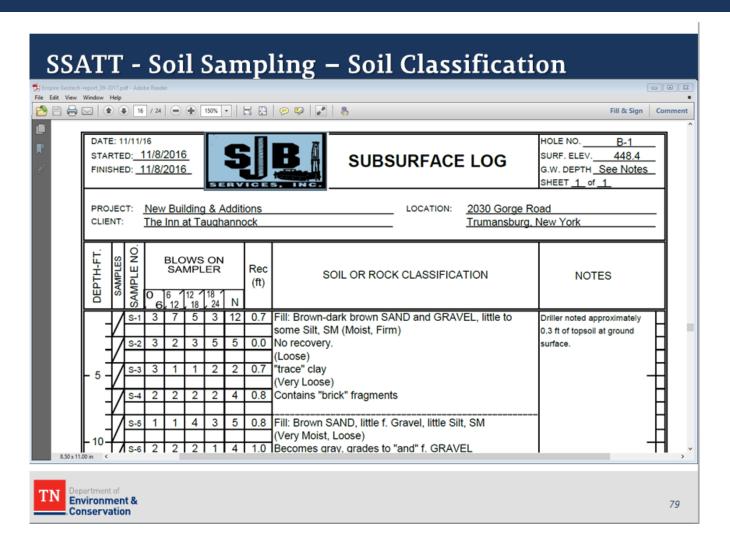
Both based on USCS - Grain size and Liquid Limit - Lab Tests

- D6913 Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis (formerly D422)
- D4318 Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils



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Soil Sampling and Testing Training

Soil Testing







Introduction – Soil Testing

What to Expect of The Testing Portion

- Commonly used ASTM Test Procedures for Soil
- Test data
- Test data applications

- Grain size Distribution
- Atterberg Limits
- Moisture Content
- Soil Classification
- Standard and Modified Proctor
- Permeability / Hydraulic Conductivity
- · Compressive Strength
- Consolidation







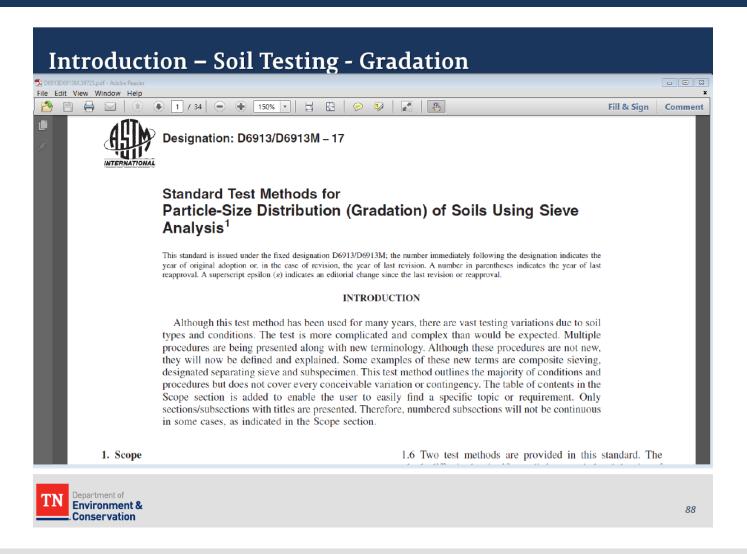
Introduction – Soil Testing

Grain Size Distribution

- D6913 Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis (formerly D422)
 - Also known as "Gradation"
 - Provides the relative percent distribution by weight of the different soil particle sizes
 - Used in combination with Atterberg Limits, moisture content and others for Soil Classification
 - Sequential sieving of samples using standardized screen sizes corresponding to the defined soil particle sizes
 - Hydrometer for silts and clays ASTM D7928









Introduction – Soil Testing

Grain Size Distribution

 D6913 - Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis (formerly D422)



Missouri S&T





Fine

SSATT - Soil Classification - USCS

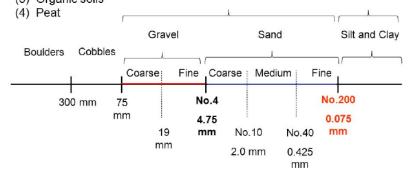
Grain Size Definitions

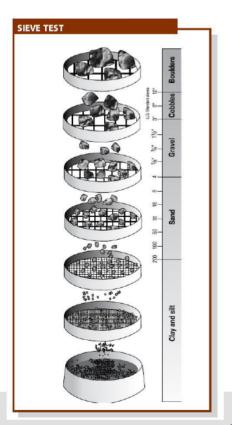
Unified Soil Classification System (USCS)

Coarse

Four major divisions:

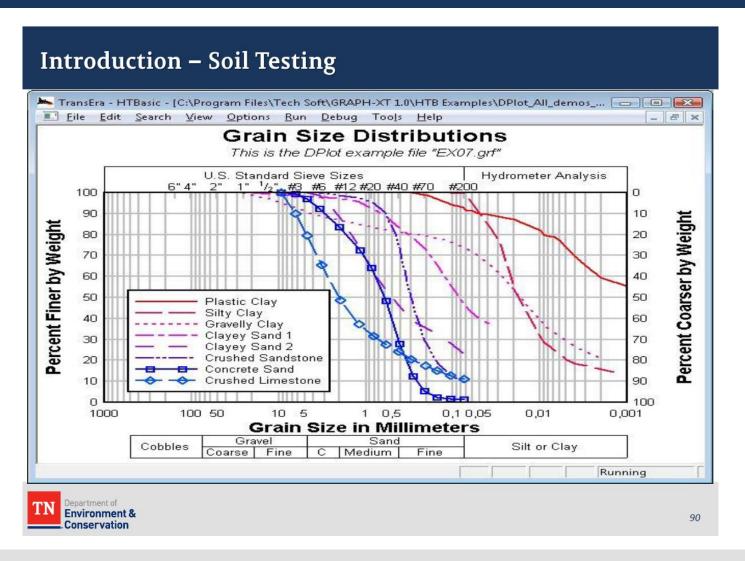
- Coarse-grained
- (2) Fine-grained
- (3) Organic soils













Introduction – Soil Testing

Atterberg Limits

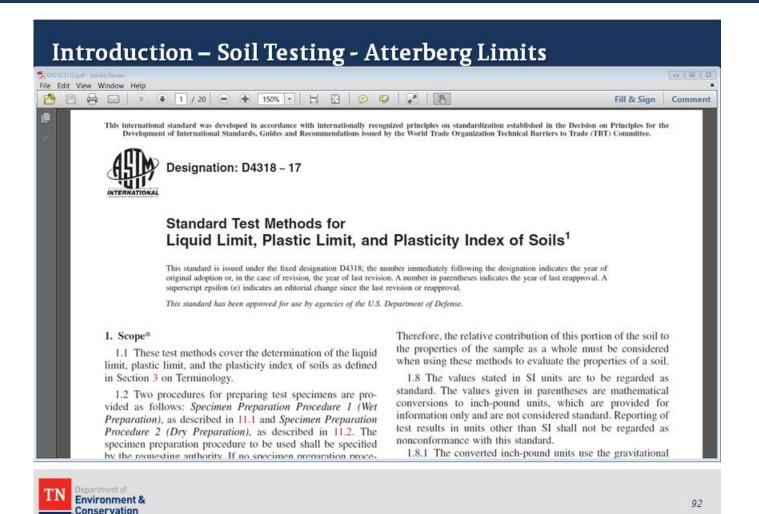
- D4318 Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
 - Albert Atterberg Swedish Chemist 1913
 - Used to determine critical states
 - Liquid Limit
 - Plastic Limit
 - Plasticity Index



For soil classification of cohesive soils and construction considerations









Introduction – Soil Testing

Atterberg Limits - definitions

 Liquid Limit – the water content, in percent, of a soil at the ...boundary between the semi-liquid and plastic states



- Plastic Limit the water content, in percent, of a soil at the boundary between the plastic and semi-solid states
- Plasticity Index the range or water content over a soil behaves plastically
 - Numerically, the difference between Liquid Limit and Plastic Limit





Introduction - Soil Testing

Atterberg Limits – procedure



Missouri S&T





Introduction - Soil Testing

Atterberg Limits - results

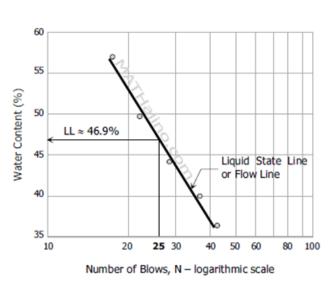
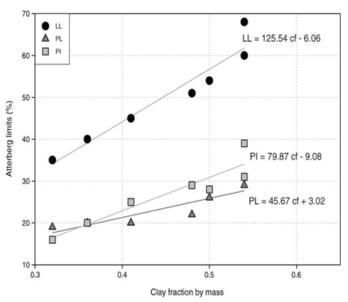


Figure 3 Typical liquid limit results from the Casagrande cup method.











tn.gov/environment/dswm-training